

**Management Indicator Species Review
Somes Bar Integrated Fire Management Project
Western Klamath Restoration Partnership (WKRP)
Orleans and Ukonom Ranger Districts
Six Rivers National Forest**

December 19th, 2017

Under the National Forest Management Act (NFMA), the Forest Service is directed to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives” (PL 94-588, Sec 6 (g) (3) (B)). The 1982 regulations implementing NFMA require that “Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” (36 CFR 219.19) Management Indicator Species (MIS) is a concept used by the agency to serve as a barometer for species viability at the Forest level. Population changes of MIS are believed to indicate the effects of management activities.

The Forest Land Management and Resource Plan for the Klamath National Forest uses Management Indicator Species (MIS) to assess potential effects of project activities on the various habitats and habitat assemblages with which these species are associated. Forty-one fish and wildlife species have been selected as MIS or assemblages for a variety of habitats that are potentially affected by resource management activities on the Forest (LRMP IV-97). For the analysis associated with this project, specific MIS were addressed based on their potential to occur within the project area and the potential for suitable habitat to be affected by project activities. Table 1 lists the MIS and assemblages occurring on the Six Rivers National Forest, and those known or thought to occur within the project area based on habitat suitability, survey results, or incidental sighting records. Habitat suitability evaluations were made using the California Wildlife Habitat Relationships System, Version 8.2 software, developed by the California Department of Fish and Wildlife. In addition habitat evaluations were made utilizing Six Rivers National Forest Wildlife Sighting Database (that includes the Ukonom RD on KNF), Six Rivers National Forest Vegetation Layer (that includes the Ukonom RD on KNF), field reviews, and Forest GIS Vegetation Layers.

Table 1. Management Indicator Species and Habitat Assemblages – Six Rivers NF

MIS Species and Habitat Assemblages	Habitat is Affected by the Project	Habitat is in or adjacent to the project areas, but is not directly or indirectly affected by the project	Habitat is not in or adjacent to the project area and is not directly affected by the project
Individual species			
Northern Spotted Owl	X		
Pileated woodpecker	X		
Black bear	X		
Coastal marten	X		
Fisher	X		
Black-tailed deer	X		
Bog/See/Spring/Wet Meadow Assemblage			

MIS Species and Habitat Assemblages	Habitat is Affected by the Project	Habitat is in or adjacent to the project areas, but is not directly or indirectly affected by the project	Habitat is not in or adjacent to the project area and is not directly affected by the project
Southern torrent salamander		X	
Marsh/Lake/Pond Assemblage			
Northern red-legged frog			X
Western pond turtle			X
Wood duck			X
River/Stream/Creek/Assemblage			
Cutthroat trout			X
Steelhead/rainbow trout	X		
Tailed frog			X
Summer steelhead		X	
Common merganser			X
Ruffed grouse	X		
Winter wren	X		
American dipper			X
Yellow-breasted chat			X
Cascade frog ¹			X
Long-tailed vole ¹			X
Northern waters shrew ¹	X		
Tanoak/Madrone Assemblage			
Hammond's flycatcher	X		
Western tanager	X		
Black-headed grosbeak	X		
MIS Species and Habitat Assemblages	Habitat is Affected by the Project	Habitat is in or adjacent to the project areas, but is not directly or indirectly affected by the project	Habitat is not in or adjacent to the project area and is not directly affected by the project
Snag Assemblage			
Flammulated owl	X		
Western screech owl	X		
Red-breasted sapsucker	X		
Downy woodpecker	X		
Hairy woodpecker	X		
White-headed woodpecker ¹			X
Vaux's Swift ¹	X		
Pileated woodpecker	X		
Black-backed woodpecker ¹			X

MIS Species and Habitat Assemblages	Habitat is Affected by the Project	Habitat is in or adjacent to the project areas, but is not directly or indirectly affected by the project	Habitat is not in or adjacent to the project area and is not directly affected by the project
Brown creeper	X		
Western bluebird			X
Douglas squirrel	X		
Down Woody Debris Assemblage			
Arboreal salamander			X
Clouded salamander	X		
Blue grouse	X		
Dusky-footed woodrat	X		
Western fence lizard	X		
Black Oak/White Oak Assemblage			
Acorn woodpecker			X
Scrub jay		X	
Lazuli bunting	X		
Western gray squirrel	X		
¹ Denotes species on Klamath NF MIS list			

The majority of the project area is forested habitat, and was intensively managed in the past. Seral stages range from pole to mid-mature stands with small patches of late-mature and old growth.

Proposed Action

The Somes Bar Integrated Fire Management project would establish up to 250,000 linear feet of ridgetop Strategic Fire Control Features (SFCF) and implement landscape-scale integrated vegetative, fuels reduction and restorative prescribed burning alongside roads and in interior forests, phased over 15 years. A maximum of 160 landings (30 would be newly constructed), land-term and incidental temporary hand lines, and 11 miles of temporary road access (0.6 miles of new construction) may be required to facilitate operations. Summarized in Table 2.

Manual treatments – Manual treatments are proposed as pre-treatment applied during the initial entry, with subsequent re-entries, to lower fuels concentrations and potential for torching to control fire behavior during burning operations.

Hand held equipment (chainsaws, loppers) are utilized to thin (cut) small diameter ladder fuels and to break up the continuity in areas of high concentrations of shrub species. Slash generated from manual treatments would be hand piled and burned (or scattered where concentrations are low) in preparation for understory or jackpot burning. Handpile dimensions are up to 5x5x5 feet in size, piled on slopes up to 65% and away from the drip line of predominate trees. Piles would be covered with paper and ignited during favorable weather conditions

Manual treatments would occur in areas where there is no opportunity for restoration forest bi-products such as firewood and sawlogs. This may be due to the topography (not conducive to heavy equipment access or safe operations), protection of natural resources vulnerable to ground disturbance or in larger more mature stands where only smaller diameter fuel reduction is necessary to prepare the ground for follow up prescribed burning.

Manual treatments would be implemented within select riparian areas. Most of the perennial and intermittent streams in the project area provide a natural obstacle to the rate of spread and consumption from understory/jackpot burning and may not require much treatment as the first entry. Where thinning of small diameter ladder fuels is needed to insure positive prescribed burning effects adjacent to streamcourses, this activity would be limited to vegetation to 4-6 inches in dbh.

Table 2. Proposed Action Treatment Summary

Treatment Methods	Area and/or Length	
Strategic Fire Control Feature Actions	Feet	
Ridgetop Shaded Fuel Break	105,524	
Handline	145,298	
Roadside fuel break + interior units	Acres	
Manual, Rx Burn	2658	
Mastication / Manual, Rx Burn	187	
Mechanical - cable system/ Manual, Rx Burn	176	
Mechanical - ground-based / Manual, Rx Burn	1058	
Rx Burn	1491	
Total	5570	
Landings - Mechanical and Mastication units only	Number	Acres
Existing Landing	130	63
New Landing	30	13
Total	160	76
Temporary Use Road – Access to Mechanical and Mastication units	Miles	
Existing Mastication Access Road	2.3	
Existing Temp Roads	8.1	
New Temp Road	0.6	
Total	11	
Level 1 Roads to be Used - Mechanical units and provides access to manual and Rx fire units	Miles	
13N12A	0.9	
13N14A	1.2	
13N14C	0.2	
13N14D	0.5	
13N14E	0.5	
13N18A	0.3	
13N18E	0.5	
14N15	0.5	
Total	4.7	
Legacy Road Restoration		
Route ID	Miles	
9400	0.09	
9100	0.35	
9101	0.13	
9102	0.22	
9103	0.19	
9402	0.11	
Total	1.09	

Mechanical Treatments –Ground, cable and road based heavy equipment (yarder, tractors) are utilized to remove excessive fuel build up in plantations over 40 years of age and older, more mature stand. In plantations, residual canopy closure would be maintained at 40-60% of existing conditions. For example, non-plantations where larger black and white oak or sugar pine are being encroached by other less fire tolerant conifer species, efforts would be aimed at culturing around these more fire tolerant species to promote their health and vigor and to help ensure these species continue to thrive in the project area. This will also aid in our efforts to provide meaningful forest industry jobs. Activity fuels may also be handpiled and burned.

Ridgetop Shaded Fuel Breaks – Strategic ridges identified as important control features for prescribed burning and wildland fire response tactics. Similar to the access/egress shaded fuel breaks but narrower in scope. Manual treatments may include handpile burning or lop and scattering of fuels up to 100' off ridge features, supported by a two-foot wide handline construction

Prescribed Burning – To achieve the desired results of low to moderate intensity, with minimal high intensity fire effects from prescribed burning, the majority of the project area would need to have mechanical or manual treatments completed prior to initiating prescribed burning. Some of the project area is not accessible due to very steep terrain or is already in the condition (more open stands, no ladder fuels) that would achieve the desired effects from burning without any pre-treatments.

Prescribed burning would target the reduction of small diameter ladder fuels and breaking up the continuity of excessive fuel build up. Important cultural and ecological plant and tree species would be protected from adverse fire effects, either by installing temporary fire lines or altering ignitions patterns. Riparian areas would not be directly ignited, but fire would not be prevented from entering into it. If its determined that the initial fuel loading is too heavy in the riparian area to allow prescribed fire to enter, then handlines or “wet lines” would be temporarily employed to reduce the potential for adverse impacts to stream temperature and water quality. Follow up understory burn treatments would occur approximately every 2-7 years according to site specific objectives.

Project Design Features, Wildlife:

- Shaded fuelbreak construction may occur in suitable threatened, endangered and sensitive species habitat. No overstory trees or overstory canopy would be removed; however, in areas where the existing overstory canopy closure is low (but greater than 40%) treatments in secondary or understory canopy layers should maintain a minimum overall canopy closure of 60%.
- Roadside fuelbreaks (300 feet each side of the road) would retain approximately 30 percent of uncut understory vegetation to provide cover for other wildlife species. Leave

about 30 percent of existing understory vegetation in a mosaic pattern that feathers more leave patches in the latter half (150 feet to 300 feet) of the fuelbreak.

- The project would not remove potential threatened, endangered, and sensitive species nest trees (predominants) or affect the canopy around potential nest trees in suitable habitat. Directional falling would be used to protect all predominant trees and the any tree forming a canopy around the predominants.
- Snags and logs would be retained as per Klamath National Forest Land Resource Management Plan, Standard and Guidelines Table 4-4, and Table I-1 of the LRMP FEIS provides standards for snag retention. The LRMP guidelines recommend 5 snags per acres averaged across a 100 acre area. This was a site specific recommendation FEIS (Table I-1) advises that NSO high quality habitat would have 8 snags per acre on an average area basis. Each acre need not meet these standards. 5-8 per acre is safe with the higher standard being applied to HQ NR habitat. We will have limited treatment in these areas so we should meet this standard in the WKRP project no problem.
- In early seral-stage stands lacking downed woody debris (shrub and pole seral stages), small diameter slash would be piled and left on site to provide cover for small mammals, birds, reptiles and amphibians. Handpile dimensions are up to 5x5x5 feet in size, piled on slopes up to 65 percent, and away from the drip line of predominant trees. Small diameter debris decomposes quickly, so large piles may have greater longevity. The Klamath National Forest LRMP Chapter 4, pg. 4-15 standards and guide 6-16 recommends 1.) maintain 5 to 20 pieces of CWD per acres in various stages of decay and 2.) leave large logs, conifer and hardwood, sound and cull of at least 20 inches in diameter and about 40 cubic feet in volume when they are available. Down logs should reflect the mix of species in the stand.

Effects of the Proposed Action on MIS

Species Information: Individual Species

Northern spotted owl (*Strix occidentalis caurina*)

Suitable Habitat Description

The northern spotted owl (NSO) is a medium sized owl that inhabits conifer forests of the Pacific Northwest. Suitable NSO nesting and roosting habitat, as defined by the Forest Service, is comprised of mature (130+ age) timbered stands having multi-layered conditions, an average canopy closure of 60% or greater (both conifers and hardwoods) and obvious decadence. The overstory should be comprised of conifer trees 21 inches or greater diameter at breast height (dbh). Conifer canopy closure should be 40% or greater.

Nests are usually in snag cavities or broken tops of large trees in mature/old-growth forest (Remsen 1978). Daytime roost sites in northern California are in dense, multi-layered canopy forests, and average 550 feet from water (Zeiner et al. 1990).

NSO are yearlong residents and maintain individual territories, often for several years or even decades. Territory size ranges from 100-340 acres (Gould 1974). The average home range of the NSO is approximately 1.3 miles from the nest site, with the most activity occurring within 0.7 miles of the nest tree. They are especially territorial during the breeding season from early spring through late summer.

Direct and Indirect Effects

The Somes Bar Integrated Fire Management Project has approximately 1369 acres of nesting/roosting (N/R) habitat and approximately 1829 acres of foraging (F) habitat in the treatment areas. There are approximately 15,369 acres of N/R habitat in the 46,243 acre Analysis Area, with approximately 12,615 acres of F habitat.

The proposed treatments and acreage are reported in Table 3. Nesting/roosting habitats will maintain a minimum of 60% canopy cover and foraging habitats will retain 40% canopy cover, therefore neither would be downgraded by treatments.

Table 3. Proposed Project Treatments within Critical Habitat by Treatment Type.						
Habitat	Acre of Habitat Within CHU Within Treatment Area	Treatment in Critical Habitat				
		Commercial Thin (acres) (Groundbased, Road Based, Cable units, possibly not all CT)	Plantation (acres)	Fuel Reduction (acres) (Manual and Mastication Units)	Roadside Treatment (acres) Habitat Within Access Egress Buffer	Underburn (non-overlap)(acres) Burn Only Units
Nesting/ Roosting	1241.9	166.5	27.4	671.1	389.7	404.3
Forage	1335.7	327.7	109.8	644.1	493.9	363.8
Dispersal	976.0	414.7	720.6	428.7	377.4	132.6
Non Habitat	816.3	138.6	396.5	530.9	327.4	146.7
Total	4369.8	1047.6	1254.3	2274.7	1588.4	1047.6

Habitat impacts for this species have been analyzed and documented in the Somes Bar Integrated Fire Management Project: Biological Assessment (BA) to be reviewed by the U. S. Fish and Wildlife Service.

Population Trend

The Northern spotted owl is listed as Threatened under the Endangered Species Act. Eleven demographic studies of the northern spotted owls showed an average annual decline of 8.3 percent (standard error of 1.3 percent) throughout its range over the period 1985 through 1998 (SNFPA 2001). Using estimates of juvenile emigration to adjust the vital rates, an adjusted estimate of lambda suggests an overall rate of decline of 3.9 percent for the northern spotted owl during the study period (SNFPA 2001 referencing Franklin et al. 1999).

Northern spotted owls occur across the Forest. Reproductive status is defined as evidence of at least a nest, in any year. As of the end of 2012, the Forest spotted owl database included 155 reproductive pairs, 126 non-reproductive pairs and 28 resident (territorial) singles. The Forest designated an activity center for each pair and resident single bird, for a total of 309 analyzable activity centers. Periodic protocol surveys associated with annual monitoring and proposed management activities, are conducted at historic NSO activity centers throughout the Forest to determine the status of the territories.

In addition to status visits and protocol surveys, the Forest Service funds an ongoing NSO demography study in two areas of northwestern California: a regional study area (RSA) and the Willow Creek Study Area (WCSA) and includes portions of the Six Rivers, Klamath, and Shasta-Trinity National Forests. The RSA encompasses about 688 square miles and the WCSA encompasses about 113 square miles. The study was initiated in 1985 as a long-term study on the population dynamics of northern spotted owls (Franklin et al. 2004).

Franklin et al. (2004) found that reproduction in the northern spotted owls in the WCSA continues to follow a pattern of low productive output in “bad” years and average or, occasionally, high reproductive output in “good” years. There were four years of very low reproductive output that led to variation in the results. The low reproductive output in 1995 and 1999 were followed by three years of average and above average reproductive output. Annual survival rates also seem to be partially explained by “good” versus “bad” years. The years with both low reproductive output and low survival seem to be occurring every 3-4 years and may be explained by weather and climatic events (Franklin et al. 2004). More information is needed to accurately assess a population trend, particularly addressing the emigration of juveniles from the study area.

In 2013, 94 historic owl territories on the Willow Creek and Regional Study Areas (WCSA and RSA, respectively) were surveyed. Twenty-six of the 94 territories surveyed were determined to be occupied by pairs and 7 territories were occupied by single males. The proportion of occupied territories was 0.35, slightly lower than in 2012 but was an indication that the population was more stable over the last year compared to large drops in occupancy in 2011-2012. Of the occupied territories, 24 pairs and 4 singles were assessed for reproduction. There were 11 nesting pairs, 46% of those assessed for reproduction. This is slightly lower than the long term average of 52%. Of those pairs nesting, one apparently failed to fledge young. The remaining 10 pairs fledged a total of 15 young. The warm, dry spring likely contributed to the normal breeding season; however, productivity appeared to be higher on the WCSA where most nesting pairs fledged 2 young than on the RSA where all 4 nesting pairs fledged 1 young each. (Franklin et al 2013, unpublished report).

Forest-scale Habitat

There are approximately 673,207 acres of NSO habitat on the Six Rivers National Forest (440,575 acres of nesting/roosting habitat and 232,631 acres of foraging habitat). This estimate does not include habitat on private lands located within the Forest administrative boundary.

The Forest manages large late-successional reserves (LSRs) to protect and enhance habitat for northern spotted owls and other plants and animals associated with mature and old growth forests. The large LSRs on the Forest include approximately 245,835 acres of suitable habitat. In addition, 100-acres (40.5 ha) of the best habitat were designated around known (as of January 1, 1994) owl activity centers located outside of large LSRs. On the Forest, 8,932 acres of habitat associated with individual NSO territories are allocated as 100-acre LSRs. LSRs were designed to provide blocks of old-growth and late successional habitats well distributed across the landscape for the benefit of all late successional and old growth associated species.

In addition to LSR land allocations, the LRMP identifies additional congressionally and administratively withdrawn lands, which would further limit management activities within suitable NSO habitat. In fact, only about 171,658 acres of the 1,101,874 acres (15.6%) that make up the Six Rivers National Forest are allocated to General Forest, where timber harvest is identified as a management objective. Even within the General Forest land allocation, all LRMP Standards and Guidelines must be met for each proposed management action, further minimizing the potential impacts of proposed management activities on NSO habitat.

There has been a modest amount of acres of NSO habitat removed (83 acres) or degraded (4,831) since the 1995 LRMP. The greatest impact to NSO habitat has not been from authorized management activities, but from wildfire (approximately 22,000 acres of suitable habitat lost or degraded). This represents approximately 7% of the available habitat across the Forest.

A discussion of cumulative effects can be found at the end of this document.

Pileated Woodpecker (*Dryocopus pileatus*)

Suitable Habitat Description

Suitable and optimal pileated woodpecker (PIWO) habitat is similar to conditions preferred by the northern spotted owl. Pileated woodpeckers prefer multi-storied mature and late-mature successional conifer forests with moderate to dense canopy closure ($\geq 60\%$), and abundant snags and down logs. This species forages primarily in dead wood; therefore, both standing snag and down log densities are important indicators of habitat quality (Bull and Holthausen 1993). Carpenter ants, wood boring beetles and larvae (Zeiner et al. 1990) are the primary prey items.

The species is a primary cavity nester utilizing dead or dying trees (Decay Class 1 or 2). Schroeder (1983) reports that the mean nest tree size in Oregon was 76 cm (30 inches) dbh with a minimum nest tree size of 51 cm (20 inches) dbh.

The average home range for PIWO in northeastern Oregon was 128-240 hectares (320-600 acres; Bull and Meslow 1977). However, more recent work by Bull and Holthausen (1993) found wide variety in territory size and recommended that areas approximately 364 acres in size be managed for pileated woodpecker.

Direct and Indirect Effects

The habitat conditions are of varying quality for PIWO throughout much of the project area, but the species will use habitats similar to northern spotted owls (NSO). Therefore, estimates of PIWO habitat in the four focal areas are based on nesting/roosting habitat types for the NSO. Past management has removed large tracts of suitable habitat and fragmented remaining patches within the 46,243 acres of the analysis area. None of the manual or mechanical treatments will downgrade the potential 1369 acres of suitable habitat for the PIWO and habitat will likely be improved in the long run through project implementation.

Currently there are approximately 15,368 acres of potentially suitable habitat occur for this species in the wildlife analysis area. Treatments in the four focal areas will occur in 1369 acres of suitable habitat and represent 9% of the suitable habitat treated in the analysis area. For any of the proposed treatments in suitable habitat, canopy cover will not be reduced below 60% of currently suitable PIWO habitat; therefore the habitat is expected to remain suitable post-project.

Population Trend

The national population of pileated woodpeckers, as reported by the USGS Breeding Bird Survey data (1966-1999), is increasing at a rate of 1.4% per year; in California, pileated woodpeckers are increasing at a rate of 0.4% per year (Sauer et al. 1999). On the Six Rivers National Forest, the pileated woodpecker population is “largely stable with local variation in the amount of survey effort and detection across the forest” (PSW 2007).

Forest-scale Habitat

Currently there are approximately 440,575 acres of suitable PIWO habitat on the Six Rivers National Forest. The Forest employs a management strategy primarily based on land use designations and allocations. This management strategy benefits wildlife through the retention of habitat. Specifically, the Late Successional Reserves and other congressionally and administratively withdrawn land allocations (91% of the Forest) provide the pileated woodpecker with large contiguous blocks of habitat and corridors of high quality habitat between the blocks (riparian reserves). Where management activities are authorized, all proposed activities adhere to LRMP Standards and Guidelines and the Pileated Woodpecker Habitat Capability Model, which provides protection measures to ensure the retention of suitable habitat.

There has been a modest amount of acres of PIWO habitat removed (83 acres) or degraded (4,831) since the 1995 LRMP. The greatest impact to PIWO habitat has not been from authorized management activities, but from wildfire (approximately 22,000 acres of suitable habitat lost or degraded). This represents approximately 7% of the available habitat across the Forest.

A discussion of cumulative effects can be found at the end of this document

Black Bear (*Ursus americanus*)

The black bear is a widespread, common to uncommon resident occurring from sea level to high mountain regions. The black bear occurs in dense, mature stands of forest habitats, and feeds in

a variety of habitats including brushy stands of forest, valley foothill riparian, and wet meadow. This species dens in various cavities and hollows in trees, snags, stumps, logs, uprooted trees, talus slopes, or in the earth. These habitat elements must be in mature, dense vegetation, and on sheltered slopes for adequate denning. The average home range for male black bears in northwestern California has been found to be approximately 4.1 square miles (2,624 acres), with female home ranges averaging (896 acres) (Kellyhouse 1975).

Direct and Indirect Effects

The black bear will utilize early mature stands with legacy components (large logs etc.) for denning. There are approximately 15368 acres of late successional habitat in the analysis area, of the 46,243 acres of potentially suitable habitats in the Analysis Area. There is approximately 1487 acres of mature stands habitat in the 6580 acres action area. In the long run, habitat conditions for the black bear will be improved in the project area through project implementation.

Since the black bear is a habitat generalist, all 5570 acres of proposed activities could impact suitable habitat. This accounts for 12.0% of the suitable habitat in the analysis area. Implementation of the project will maintain and improve habitat conditions for black bear by retaining snags and downed logs, as well as maintenance of hardwoods and other associated mast bearing species. In the long term, the project is designed to accelerate the development of late-successional characteristics, including the recruitment of large snags and downed logs.

Population Trend

The California Department of Fish and Wildlife (CDFW) monitors black bear populations within northwestern California. Black bear is “S5- secure” (“demonstrably widespread, abundant, and secure”) in California (NatureServe 2006). California's black bear population has increased over the past 25 years. Sitton (1982) estimated the statewide bear population to be between 10,000 and 15,000 animals. Presently, the statewide black bear population within the 52,000 square miles of known range is conservatively estimated to be between 25,000 and 30,000 (CDFG 2006). Previous and ongoing studies indicate that bear densities range from 1.0 to 2.5 bears per square mile in the North Coast/Cascade (50% of the statewide population). The northern portion of California is continually noted by CDFW as supporting the highest density of bears of any area within the western United States.

Forest-scale Habitat

There are 440,575 acres of suitable, late-successional black bear habitat on the Six Rivers National Forest. This is likely a very conservative number since the black bear is a habitat generalist and there is likely an additional 260,308 acres of suitable habitat on the Forest.

Habitat loss is the leading threat to wildlife populations in California. However, over half of the suitable black bear habitat in California is in public ownership, including National Forest lands. Current ownership patterns allow large blocks of black bear habitat to remain undeveloped and

bears encounter few humans in the core areas within these blocks (Forest and Rangeland Resources Assessment Program 1989 in California Department of Fish and Game 2004).

Ninety-one percent of the Six Rivers National Forest is protected in reserve land allocations. In addition, all proposed activities adhere to LRMP Standards and Guidelines designed to minimize potential impacts to wildlife habitats.

The proposed activities would occur in 5569 acres in the project area, much of it being black bear habitat, with fuel, commercial thinning, pre-commercial thinning and roadside treatments. This equates to 1% of the available habitat on the Forest. The habitat would remain suitable post-project and these treatments are expected to improve the quality of the habitat by accelerating the stand toward late successional characteristics.

Based on the amount of available suitable habitat and the fact that a majority of the best quality habitat is protected in reserves, the amount of habitat potentially affected by this project would be insignificant.

A discussion of cumulative effects can be found at the end of this document

Coastal Marten (*Martes caurina*)

Suitable Habitat Description

Marten prefer closed canopy, mature to old growth mixed conifer, white fir, red fir and pine forests, with complex structure on or near the ground (Buskirk and Ruggiero, 1994). Late seral stage and old growth forests provide the large woody structures necessary for nesting and resting as well as adequate prey populations. Locally, Humboldt martens (*Martes americana humboldtensis*) utilize old growth Douglas fir stands on non-serpentine soils and late seral stage mixed-conifer (Douglas fir, sugar pine, western white pine and lodgepole pine) on serpentine soils (Slauson *et al.* 2009b). Martens require a dense shrub layer (>60%) in both habitat types for foraging and concealment from predators. Dominant shrub layer species include: salal, evergreen huckleberry, Pacific rhododendron, huckleberry oak and bush tanoak (Slauson and Zielinski, 2009).

Resting habitats consist of cavities in large trees, snags, stumps, or logs, as well as in woodpiles, rocky crevices and shrub clumps. Slauson and Zielinski (2009) reported large snags (dbh >35in) as the primary resting structure for Humboldt martens on non-serpentine soils. Resting structures also occurred on the ground in large (dbh >28in) conifer logs. On serpentine soils primary resting sites were located in rock and shrub clumps.

Denning sites are typically in cavities of large diameter logs, snags or live trees. Little is known about the denning preferences of the Coastal marten. Slauson and Zielinski (2009) reported one female with a kit at three structures: in a live chinquapin, in a broken-top Douglas fir and in a Douglas fir snag.

Limited information is available for home range size for the Coastal marten. Seasonal (summer-fall) home range was estimated at 1,322 acres for adult males, 315 acres for a single adult female and one kit and 1,490 acres for juvenile females (Hamlin *et al*, 2010).

Direct and Indirect Effects

The Somes Bar Integrated Fire Management Project has approximately 1369 acres of denning/roosting (D/R) habitat and approximately 1829 acres of foraging (F) habitat in the treatment areas. There are approximately 18,116 acres of D/R habitat in the 54,726 acre Analysis Area, with approximately 15,691 acres of F habitat, in the 7th field watersheds examined.

The proposed treatments and acreage are reported in Table 4. Nesting/roosting habitats will maintain a minimum of 60% canopy cover and foraging habitats will retain 40% canopy cover, therefore neither would be downgraded by treatments.

Table 4. Proposed Project Treatments within Mesocarnivore Habitat by Treatment Type.					
Habitat	Treatment in Critical Habitat				
	Commercial Thin (acres) (Goundbased, Road Based, Cable units, possibly not all CT)	Plantation (acrea)	Fuel Reduction (acres) (Manual and Mastication Units)	Roadside Treatment (acres) Habitat Within Access Egress Buffer	Underburn (non- overlap)(acres) Burn Only Units
Denning/ Roosting	166.5	27.4	671.1	389.7	404.3
Forage	327.7	109.8	644.1	493.9	363.8
Dispersal	414.7	720.6	428.7	377.4	132.6
Non Habitat	138.6	396.5	530.9	327.4	146.7
Total	1047.6	1254.3	2274.7	1588.4	1047.6

Population Trend

The current occupied area is 267 square miles extending from the mouth of Rock Creek on the Smith River in the SNRA south to near Fish Lake in the Bluff Creek watershed, on Orleans Ranger District, within 1.2 mi (2 km) of the Klamath River and east to the headwaters of Rock Creek (drainage of the Klamath River) in Siskiyou County (Slauson *et al*. 2009b). This area encompasses lands on the Smith River National Recreation Area, Orleans Ranger District, Ukonom Ranger District, redwood state parks and private timber lands.

Current population estimates by Slauson *et al*. (2009b) show a decline from 2000-01 surveys from approximately 60 individuals to approximately 40 individuals in 2008. These estimates were determined using a multi-state occupancy method utilizing detection data from 2000-01 and 2008 surveys. These surveys did not cover all possible habitat but the population is likely to be <100 individuals.

Forest-scale Habitat

There are approximately 440,575 acres of potentially suitable marten habitat on the Forest. This estimate does not include habitat on private lands located within the Forest administrative boundary. This is an overestimate of potential habitat in that the current range of the species is the southern portion of the Smith River NRA and the northern portion of the Orleans and Ukonom Ranger Districts. There are 271,902 acres of suitable marten habitat across these three districts.

The Forest manages large late-successional reserves (LSRs) to protect and enhance habitat for species associated with mature and old growth forests. The large LSRs on the Forest include approximately 245,835 acres of suitable marten habitat. LSRs were designed to provide blocks of old-growth and late successional habitats well distributed across the landscape for the benefit of all late successional and old growth associated species.

In addition to LSR land allocations, the LRMP identifies additional congressionally and administratively withdrawn lands, which would further limit management activities within suitable marten habitat. In fact, only about 171,658 acres of the 1,101,874 acres (15.6%) that make up the Six Rivers National Forest are allocated to General Forest, where timber harvest is identified as a management objective. Even within the General Forest land allocation, all LRMP Standards and Guidelines must be met for each proposed management action, further minimizing the potential impacts of proposed management activities on marten habitat.

There has been a modest amount of acres of marten habitat removed (83 acres) or degraded (4,831) since the 1995 LRMP. The greatest impact to marten habitat has not been from authorized management activities, but from wildfire (approximately 22,000 acres of suitable habitat lost or degraded). This represents approximately 7% of the available habitat across the Forest.

A discussion of cumulative effects can be found at the end of this document.

Black-tailed Deer (*Odocoileus hemionus*)

Suitable Habitat Description

The black-tailed deer is a common wide spread game species that occurs throughout most of California. This species is a habitat generalist and is known to occur in a variety of habitats including conifer, oak woodland, shrub, riparian and meadow habitats. This species typically moves through elevation gradients between these various habitat types in response to seasonal changes in temperature, available cover, forage and water.

In the summer, the black-tailed deer migrate from lower elevation meadows where they spend the spring, upslope to their summer range. Black-tailed deer spend summer months at higher elevations where summer temperatures have melted snow and new plant growth is occurring. The new growth provides forage with high nutritive value when lower elevation habitats are dry.

In autumn black-tailed deer feed heavily on acorns in oak woodlands preparing for the rutting season and the coming winter months. During the winter, when temperatures are cold and snow covers the ground, black-tailed deer migrate back down to lower elevations where they spend the winter in shrubby habitats that contain abundant forage, water and cover. Vegetative cover is critical for thermal regulation and escape cover during these cold winter months.

Black-tailed deer would use south facing slopes during the winter months to aid in thermal regulation. In the spring black-tailed deer are most commonly associated with meadows where they forage primarily on the tender new growth of forbs and grasses. As the season continues the meadows begin to dry up and the forbs and grasses become less palatable and less nutritious. Deer then begin their migration back to their summer range in the higher elevations.

Fawning occurs during the late spring and early summer. Pregnant females move to suitable fawning habitat where they utilize dense shrub lands, forests and riparian habitats with available water and abundant forage while giving birth and rearing their fawns. Females will defend a small territory immediately surrounding their fawn. Cover, water and abundant forage are the important habitat components of suitable fawning habitat because they allow females to maintain their strength and health while nursing and defending their fawns. If cover, forage and water are not present, the female and her fawn have a decreased chance of survival.

The average home range for small doe and fawn groups were 0.4 - 1.1 square miles, but varied from 0.2 – 1.9 square miles in Lake County. Typical home ranges are usually less than 1 square mile (640 acres) in diameter (Timmosi 1990).

Direct and Indirect Effects

As a habitat generalist, it is possible that the all project activities occur in potentially suitable black-tailed deer (BTDE) habitat. The proposed project may degrade 5569 acres of potentially suitable BTDE habitat, approximately 12% of the available habitat for the four focal areas with a 1.3 mile buffer in the analysis area (46,243 acres in analysis area). This may overestimate the amount of potential habitat since many of the commercial thin, pre-commercial thin, fuel and roadside treatment units are densely stocked with 100% shrub cover (difficult to move through).

Activities that remove thermal cover and suitable fawning habitat would negatively affect BTDE; however thinning and fuel treatments are not expected to significantly change the suitable habitat components. Canopy closure would be maintained which would maintain vegetative screening cover conditions within the project area and adjacent to roads.

Fuel and roadside treatment units may degrade 303.6 acres of potentially suitable habitat; there is potential for understory burning to have short-term negative impacts on the species, but are likely to improve habitat in the long term by instigating new growth and improving, stand resilience to fire and restoring meadows.

Implementation of the project will maintain current habitat conditions for deer and improve habitat conditions in the long term.

Population Trend

Black-tailed deer populations are monitored by California Department of Fish and Wildlife (CDFW). The Somes Bar Integrated Fire Management Project is located within North Coast Management Unit (DAU-1) as delineated by CDFW. The Department of Fish and Wildlife has noted that the North Coast Management Unit is the most productive in terms of deer/square mile. The deer population has been considered stable in recent years with population surveys yielding census counts from 170,000 to 250,000 individuals.

Bog/Seep/Spring/Wet Meadow Assemblage

Southern Torrent Salamander (*Rhyacotriton variegatus*)

This species is found from near sea level to 4,820 feet in elevation. Preferred habitat is described as cold, permanent seeps and small streams with a rocky substrate. Welsh and Lind (1996) found that this species is associated with cold, clear headwater to low-order streams with loose, coarse substrates in humid forest habitats with large conifers, abundant moss, and greater than 80% canopy cover. These conditions are mostly found within late seral stage forests. According to Welsh and Lind (1996) suitable habitat has the following characteristics: 1) conifer dominated forests associated with mature to old growth structural attributes; with 15-130 conifers per acre greater than 21 inches dbh, 72-100% canopy closure, and low numbers of cut stumps, low % cover of grass, and high % cover of moss; 2) seep or other shallow, slow flowing habitats with cold, clear water in first to third order streams; with 15-46% of the substrate in cobble, a mix of coarse substrates (cobble, pebble, and gravel), 3-47% substrate cementedness, and sand and fine organic particles present; and 3) water temperature from 43.7-59.0 ° F.

Direct and Indirect Effects

Canopy closure will be maintained in the inner 80-foot buffer of all Riparian Reserves (RR) and vegetation will be retain approximately 30% for 4- to 6-inch dbh manual treatment in Somes Bar Integrated Fire Management Project treatment units. The total acreage of RR in the four focal areas is 2589 acres, of which 1453 acres are within the inner-80-feet buffer and 1135 acres in the outer-80-feet buffer. Of the outer-80-feet buffer, 147 acres are proposed to have mechanical treatment, leaving the total RR with no mechanical treatment at 2442 acres.

Southern torrent salamanders are rarely found more than 1 meter (approx. 3 feet) from the streams edge (Welsh and Lind 1996), which is well within the no-treatment buffer. Habitat for this species will not be impacted; therefore the proposed action is not expected to have any direct, indirect or cumulative effects on the population of southern torrent salamander.

Proposed activities will not occur in suitable southern torrent salamander habitat. Implementation of the project will maintain and improve habitat conditions for the southern torrent salamander.

Marsh/Lake/Pond Assemblage

There is no suitable habitat for any species in this assemblage within the Somes Bar Integrated Fire Management Project area.

River/Stream/Creek Assemblage

Suitable habitat exists for some of the fish species in this assemblage. There is no suitable habitat for the majority of the terrestrial species in this assemblage within the Somes Bar Integrated Fire Management Project area; however limited suitable habitat does occur for the Pacific wren and ruffed grouse and both species have been detected in the project area.

Forest plan direction allows for silviculture and fuels treatments within riparian reserves when needed to meet ACS objectives. Fuel reduction treatments can potentially assist in riparian and stream restoration when actions include the return to fuel loads and vegetation that supports ecosystem processes and natural disturbance regimes, including restoring fire to the landscape (Dwire et al. 2016). Riparian zones in the *Somes Bar Project* area were delineated by forest hydrologists, geologists, and fisheries biologists and totaled 3,072 acres. Riparian reserves are represented in the lower elevations of the watersheds by the TEK focal species Willow (primarily located along the mainstem Klamath River) and the Pacific giant salamander. The riparian reserve system provides travel corridors for wildlife species, including Roosevelt elk and Pacific fisher, two more TEK focal species. Before the NWFP, timber harvest occurred in what are now designated riparian reserves. Much of the riparian areas would burn like adjacent uplands, as the riparian vegetation terrain and topography are similar to surrounding uplands. Fuel abundance/accumulation is likely to be similar to the uplands.

Stream riparian areas consisted of perennial, intermittent, or ephemeral streams, and the area on each side of these channels between 160-foot-slope distances for “non-fish bearing” streams up to 320-foot slope distances for “fish bearing” streams.

Summer Steelhead, Steelhead/Rainbow Trout (*Oncorhynchus mykiss*)

These “fish bearing” streams provide habitat for steelhead/rainbow trout and include the mainstem Klamath (20 miles) and the lower portion of Burns, Kennedy, Ti, Sandy Bar, Stanshaw, Rogers, Teneyk, Natuket and Donahue Flat creeks for a combined additional nine miles of the wider riparian reserve boundaries. Summer steelhead are found in the mainstem Klamath but these tributaries do not provide the deep holding pools. Forested ponds, wetland features and associated aquatic vegetation have designated equipment exclusion zones. Suitable habitat exists for steelhead/rainbow trout, however, the project was designed to minimize effects to TEK focal species such as Pacific giant salamander and willows such that shade (temperature) would not be affected. This plus design features for water withdrawal and best management practices to minimize sedimentation effects would result in no measurable impacts to the aquatic species in this assemblage. Water Drafting would not occur within fish bearing reaches without use of fish screens and minimum flow requirements. The project would benefit aquatic habitat by reducing the risk of high severity fire and, through the reduction of sedimentation through decommissioning identified roads.

Pacific Wren (*Troglodytes troglodytes*)

The Pacific wren is an uncommon resident in dense, mature conifer, hardwood-conifer and riparian forests of the humid coastal belt from the Oregon border to northern San Luis Obispo County. Components of suitable winter wren habitat include presence of dense riparian vegetation near streams, natural recesses or cavities for nesting and abundant prey. This species prefers riparian habitats with downed woody debris and low tangled vegetation that provides shade, cover and abundant invertebrates to forage on. This species nests within existing cavities and within recesses associated with logs, stumps and root tangles.

The Pacific wren is known to occur within the planning area. An analysis of the BBS routes on the Forest and within Northern California (Pacific Coast bioregion), showed that population trend for this species on the local scale is variable; overall it appears to have a slight decreasing trend (PSW 2007). It is important to note that the species formerly known as Winter Wren was recently divided. The data from the National level have trends associated with the previous species name, the "Winter Wren".

Habitat for the winter wren exists within the units given the lack of riparian vegetation that would be impacted by protection measure for Riparian Reserves (RR) within the project area. Therefore, the proposed action is not anticipated to have any direct effects on the population of the Pacific wren. However, in the long-term the indirect and cumulative effect of project implementation is the potential to improve habitat conditions for the wren through the release of conifer and hardwoods/shrubs through thinning prescriptions, generating a secondary canopy. The project will maintain high levels of coniferous canopy closure within the project area adjacent to RRs. Project activities will not occur within riparian habitat. Pacific wren would not be affected by the proposed activities.

Ruffed Grouse (*Bonasa umbellus*)

The ruffed grouse is an uncommon game bird associated with riparian and conifer forest habitats from northern Del Norte County to southern Humboldt County and eastward to northern Trinity County. Components of suitable ruffed grouse habitat include presence of lush riparian vegetation, adjacent conifer stands and abundant forage and prey. Riparian vegetation provides food, shade, nesting habitat and cover. Adjacent conifer stands also provide cover. The ruffed grouse forages on leaves, twigs, buds, flowers, fruits and insects. If any or all of these habitat components are disturbed by management activities, ruffed grouse may be affected.

The ruffed grouse was selected as a MIS under the River/Stream/Creek Assemblage because of its associations to riparian habitats. As noted by CDFW, ruffed grouse populations within northern California remain consistently stable which is reflected in the stability of the hunter harvest bag limit regulations over the last 5-8 years. An analysis of the BBS routes on the Forest and within Northern California (Pacific Coast bioregion), showed that the population trend for this species is increasing (PSW 2007).

Habitat for the ruffed grouse exists within the units given the lack of riparian vegetation that would be impacted by protection measure for Riparian Reserves (RR) within the project area. Therefore, the proposed action is not anticipated to have any direct effects on the population of the ruffed grouse. However, in the long-term the indirect and cumulative effect of project implementation is the potential to improve habitat conditions for the ruffed grouse through the release of conifer and hardwoods/shrubs through thinning prescriptions, generating a secondary canopy. The project will maintain high levels of coniferous canopy closure within the project area adjacent to RRs. Ruffed grouse would not be affected by the proposed activities.

Northern Water Shrew (*Sorex palustris*)

Northern water shrews are thought to be common on the forest along riparian areas or associated aquatic areas with high vegetative cover (Beneski and Stinson 1987), and are highly associated with proximity to flowing streams (Conaway 1952). Recent genetic and morphological work may have the species occurring in California being the western water shrew (*Sorex navigator*) (Nagorsen et al. 2017). Riparian Reserve project design features will protect this species habitat.

Tan Oak/Madrone Assemblage

Hammonds Flycatcher (*Empidonax hammondi*)

The Hammonds flycatcher is a common summer resident in dense coniferous forests at about 4000-8000 ft from Cascade Range south along the western slope of the Sierra Nevada to Kern Co. Preferred nesting habitats include mixed conifer and red fir; also may nest in denser Jeffrey and ponderosa pine habitats, and in Douglas-fir habitat in the mountains of the North Coast down to about 2000 ft. Nesting and roosting occurs most often in moist forest habitats with high canopy closure, and available singing and foraging perches.

This species frequents older forests, which provide well-shaded nesting and roosting sites, singing posts, and foraging perches. Nests are most commonly found in deeply shaded foliage underneath dense canopy of older forests.

Manuwal (1970) recorded mean breeding territory of 2.6 acres (range 1.5 to 3.8 acres). Breeding density varied from 5.6 to 18.8 males per 100 acres (Beaver and Baldwin 1975).

Regional population trend data for this species shows a slightly decreasing trend (Sauer, J. R., J. E. Hines, and J. Fallon. 2008).

Black-headed Grosbeak (*Pheucticus melanocephalus*)

The black-headed grosbeak is a common summer resident and transient. This species is a common breeder throughout most of California, excluding higher mountains, Great Basin, and southern deserts. This species frequents valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, and montane riparian habitats. It is less common in other wooded habitats of lower montane elevations, often near water and areas where deciduous oaks

are numerous. It is a rare and irregular in California from October to late March (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981). This species builds nest in a shrub or tree, often beside stream or other water, but may be located away from water in open woodland, orchard, or near edge of denser woodland. The black-headed grosbeak occurs in open woodlands and near edges of denser stands and favors habitats with deciduous trees, especially oaks, and a diversity of plant life.

There was no information found on home range size for this species, although breeding densities have been reported from 31 to 66 males per 100 acres (Gaines 1974). It is estimated that the home range size for this species is 1.5 acres at a minimum.

Regional population trend data for this species shows a slightly increasing trend (Sauer, J. R., J. E. Hines, and J. Fallon. 2008).

Western Tanager (*Piranga ludoviciana*)

The western tanager is a common breeding resident of montane forests throughout most of the state, including coastal ranges. This species is common and widespread in migration in foothills and lowlands. For breeding, this species prefers moderately open, mature coniferous forests with associated hardwoods, but also frequents edges of denser stands. It is probably most common in mixed conifer and montane hardwood-conifer habitats but also nests in montane hardwood habitat, including stands dominated by live oaks. Occurs widely in other wooded habitats in migration; in winter prefers groves of exotic trees, especially flowering eucalyptus. This species breeds in the Coast Ranges, usually avoiding fog belt (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

There was no information found on home range size for this species, although breeding densities in Oregon coniferous forests have been reported from 21 to 46 males per 100 acres (Wiens and Nussbaum 1975). It is estimated that the home range size for this species is 2.2 acres at a minimum.

Regional population trend data for this species shows an increasing trend (Sauer, J. R., J. E. Hines, and J. Fallon. 2008).

Direct and Indirect Effects to the Tan Oak/Madrone Assemblage

The habitat conditions are considered low quality for this assemblage throughout much of the project area. Past management has removed large tracts of suitable habitat and fragmented remaining patches. None of the commercial or pre-commercial treatments occur in suitable habitat for this assemblage and habitat will likely be improved in the long run through project implementation.

Currently there is approximately 29,287 acres of potentially suitable habitat (hardwood stand with greater than 25% canopy from above) occur for this assemblage in the wildlife analysis area at the 7th field level watersheds. Minimal suitable habitat will be removed during this project;

however, portions of the roadside shaded fuel break will occur in suitable habitat for this assemblage.

Implementation of the project will maintain and improve habitat conditions for this assemblage through the maintenance of coniferous canopy closure cover and the release of hardwoods/shrubs through thinning prescriptions. Canopy closure will be maintained in the inner 80-foot buffer of all Riparian Reserves (RR) and vegetation will be retained approximately 30% for 4- to 6-inch dbh manual treatment in Somes Bar Integrated Fire Management Project treatment units. In the long-term, the project will improve habitat conditions for this species within the area by accelerating the development of late-successional characteristics.

A discussion of cumulative effects can be found at the end of this document.

Snag Assemblage

Flammulated Owl (*Otus flammeolus*)

Flammulated owls are an uncommon summer resident locally in a variety of coniferous habitats from ponderosa pine to red fir forests. The species breeds within the North Coast and Klamath Ranges, Sierra Nevada, and within suitable habitat in mountains in southern California. This species is found within montane regions from 6,000 to 10,000 feet in elevation. Flammulated owls roost close to the trunks of fir or pine trees, and may occasionally use cavities in trees or snags for cover (Zeiner et al. 1990). Males utilize territorial “song posts”, which are mostly associated with mature, open stands of mixed ponderosa pine and Douglas fir (Reynolds and Linkart 1987a). They prefer habitat types with low to intermediate canopy closure.

Flammulated owls are secondary cavity-nesters in snags or live trees, and use cavities created by primary cavity-nesters such as woodpeckers. The standards and guidelines for snags for woodpeckers and other primary cavity-nesting species would provide for retaining habitat characteristics favorable for the flammulated owl.

The average home range for 2 males in the Sierra Nevada was 40 hectares (100 acres) (Winter 1974). Breeding densities have varied from 3.2 to 5.2 males per 100 hectares (247 acres) (Marshall 1939, Winter 1974).

Because of its secretive nature and widely scattered distribution it is very difficult to gauge population trends for this species. It is believed, however, that the population is declining due to increased habitat loss from forestry practices in the mountain west (Mccallum 1994).

Western Screech Owl (*Otus kennicottii*)

The western screech owl is an uncommon to common, yearlong resident of open, pinyon juniper, riparian, redwood, and mixed conifer habitats. The species occurs within the length of the state of California to 8,000 feet in elevation with the exception of the central and western portions of the Mojave Desert (Garret and Dunn 1981). Western screech owls are secondary cavity nesters and typically utilize abandoned woodpecker cavities for nesting as well as hollow trees, logs, and

stumps. The species utilizes a variety of habitats from coniferous to oak-woodland forest communities in combination with openings, meadows and riparian areas.

The average home range identified by Craighead and Craighead (1956) reported 1 to 1.3 square kilometers (0.4 to 0.5 per square mile, 256 acres to 320 acres) in winter and 1.8 to 5 per square kilometers (0.7 to 1.9 per square mile; 914 acres to 1216 acres) in summer. Mean territory size in Kansas woodlands was 0.3 hectares (0.7 acres; Fitch 1947).

There is no trend data, but the species probably declining slowly as habitat is lost. There is anecdotal evidence that coastal populations in the Pacific Northwest have been negatively impacted by the recent invasion of barred owls into that area (Cannings and Angell 2001).

Red-breasted Sapsucker (*Sphyrapicus ruber*)

The red breasted sapsucker is an uncommon to fairly common, yearlong or summer resident in open wooded mountainous regions of California. This species occurs from the Oregon border south in Coast Ranges and along coast to Marin County and along both the eastern and western slopes of the Cascade Range and Sierra Nevada south to Kern County (Grinnell and Miller 1944, Zeiner et al. 1990). Like other sapsuckers and woodpeckers, the red-breasted sapsucker requires tree cavities for nesting and roosting. The species is an important cavity excavator, providing nest and roost cavities for a community of secondary cavity nesters. Snags and hardwood availability are habitat variables of special consideration for these sapsuckers (Airola 1980). The species prefers nesting habitat within montane riparian habitats (aspen), montane hardwood-conifer, mixed conifer and red fir, especially near meadows, clearings, lakes, and slow moving streams.

The average territory size as identified by Howell (1952) in Modoc County, California was a minimum of 45 meters (150 ft) around the nest, and up to 6.1 hectares (15 acres).

An analysis of the BBS routes on the Forest and within Northern California (Pacific Coast bioregion), showed that the red breasted sapsucker population is increasing at all scales (PSW 2007).

Downy Woodpecker (*Picoides pubescens*)

This species is a common, yearlong resident of riparian deciduous and associated hardwood and conifer habitats. The downy woodpecker occurs throughout the state of California with the exception of the southern California desert regions and is typically found below 5900 feet in elevation. The species is closely associated with riparian softwoods and is also utilizes hardwood and conifer in close proximity to riparian habitats. The downy woodpecker exhibits a preference for aspen communities adjacent to riparian conifer/deciduous habitats.

The average territory size reported by Lawrence (1967) in Ontario reported breeding territories of 2.0 and 3.2 hectares (5 and 9 acres).

An analysis of the BBS routes on the Forest and within Northern California (Pacific Coast bioregion), showed that the downy woodpecker population is “probably stable showing variability on different spatial scales” (PSW 2007).

Hairy Woodpecker (*Picoides villosus*)

The hairy woodpecker is a fairly common, permanent resident of mixed conifer and riparian deciduous habitats from sea level to 9,000 feet in elevation. The species occurs throughout the state of California, but scarce to absent in portion of coastal central California, Central Valley, Salinas Valley, Mojave, and the Great Basin. Specific habitat includes relatively open or patchy stands of conifers with adjacent riparian habitats and abundant snags. The hairy woodpecker is a primary cavity excavator and develops cavities within the interior of snags and or dead branches.

The average territory size reported by Lawrence (1967) is 2.8 hectares (7 acres) and ranged from 2.4 to 3.2 hectares (6-8 acres) for the hairy woodpecker.

An analysis of the BBS routes on the Forest and within Northern California (Pacific Coast bioregion), showed that the hairy woodpecker population is “stable showing variability on different spatial scales” (PSW 2007).

White-headed Woodpecker (*Picoides albolarvatus*)

The white-headed woodpecker is a fall and winter migrant to the areas above the waterman ridge on the Lower Trinity Ranger District. They breed at higher elevations with Ponderosa and Sugar Pines, two of their preferred food items (Garrett et al. 1996). Habitat suitability models suggest an interspersed /juxtaposition of both low- and high-canopy cover ponderosa pine patches was important for nest-sites of this species (Hollenbeck et al. 2011). Recent genetic analysis suggest there may be several clades within this species (Alexander and Burns 2006) resulting in two subspecies separated by the transverse ranges in California.

Typical clutch sizes are 4 to 5 eggs, sometimes 3 to 7 (Garrett et al. 1996) that incubate for approximately 14 days. Both parents participate in care and feeding of the young, with the young fledging about 26 days after hatching (Garrett et al. 1996). Home range has not been determined for this species in northern California.

Vaux's Swift (*Chaetura vauxi*)

Vaux's swifts are summer breeding residents of northern California. They breed fairly common in the Coast Ranges from Sonoma County in the North and very locally south to Santa Cruz County. The species prefers redwood and Douglas-fir habitats with nest sites in hollow trees and snags (Baldwin and Hunter 1963). They are fairly common migrants throughout most of the state in April and May, and August and September. Vaux's swift occur in spring and summer, although not necessarily as breeders (Timossi 1990). Timossi (1990) indicates a wide variety of tree sizes and cover classes are used for reproduction, feeding, and cover, however, Baldwin and Zaczkowski (1963) found nests in stubs in areas with continuous canopy. Because forest edges,

meadows, burned areas and special features like streams, rivers, ponds, and lakes are used for foraging, habitat fragmentation would appear to have little effect on these swifts.

Vaux's swifts are likely to be sensitive to activities that limit the availability of snags and stubs for nesting and roosting. Habitat characteristics that can be maintained through management include the retention and enhancement of stream and meadow habitat for foraging areas as well as large snags.

The average home range reported by Bull and Beckwith (1993) is identified a maximum of 5.4 kilometers from nests, however during the majority of the study radio-tagged swifts were recorded within 1.0 square kilometer (247 acres) of the nest.

Regional population trend data for this species shows a decreasing trend (Sauer, J. R., J. E. Hines, and J. Fallon. 2008).

Brown Creeper (*Certhia americana*)

The brown creeper is a common to uncommon resident in montane habitats throughout the state of California, and in coastal conifer habitats south to San Luis Obispo County. It is a rare transient in southern deserts on Channel Islands in fall and winter. The species prefers habitats containing dense, mature stands of conifers, but is also found in hardwood and hardwood – conifer habitats, especially in winter (Grinnell and Miller 1944, Garrett and Dunn 1981). Hardwoods and riparian deciduous trees are also used as a source of cover primarily during winter. Nests are typically constructed behind loose bark and rarely within cavities and are found usually within old-growth incense cedar, coastal redwood, pine, fir, or snags.

The average home range for the brown creeper identified by Bock and Lynch (1970) within the Sierra Nevada was 11 hectares (27 acres).

An analysis of the BBS routes on the Forest and within Northern California (Pacific Coast bioregion), showed that the brown creeper population is “decreasing on local and regional scales; this species bears watching” (PSW 2007).

Western Bluebird (*Sialia Mexicana*)

The western bluebird is a fairly common-to-common yearlong resident throughout much of California, excluding the higher mountains and eastern deserts. The species breeds in open woodland of oaks, riparian deciduous trees or conifers with herbaceous understory. Optimal habitats include sparse to open canopied, mature, valley foothill and montane hardwood and hardwood-conifer communities. This species is uncommon in habitats exclusive of adjacent forest cover. The availability of snags frequently limits population density. The species typically nests within vacant woodpecker cavities in snags and stumps and will occasionally use nests of the cliff swallow.

The average territory size as reported by Wilson et. al. (1990) identified 10.2 territories per 40 hectares (10.2 territories per 100 acres) for the western bluebird.

The Gordon Hill Vegetation Management and Fuels Project is within the range of the western bluebird; however there have been no detections of the species within the project area. The species has not been detected on the Hiouchi or Big Flat BBS routes which border the project area to the north and east. Proposed activity will not affect the western bluebird or its habitat.

Douglas Squirrel (*Tamiasciurus douglasii*)

The Douglas squirrel is a common, yearlong resident of conifer, hardwood conifer, and riparian habitats of the Sierra Nevada, Cascade, Klamath, North Coast, and Warner Ranges. The Douglas squirrel occurs in California from sea level to 11,000 feet in elevation. Douglas squirrels are omnivorous and eat primarily conifer seeds and fungi as well as occasionally arthropods, bird eggs and nestlings. Mature trees with substantial crown closure provide cover. The species generally avoids forested habitats with considerable shrub understory. Reproductive activity occurs within mature conifer stands and nests are usually located within vacant cavities within live green trees and snags. However, the Douglas squirrel is known to utilize rock cavities and nests of vegetative material located in the upper canopy.

The average home range for the Douglas squirrel reported by Smith (1968) identified 0.5 hectare (1.25 acre).

The Douglas squirrel is a harvest species. The California Department of Fish and Wildlife monitors the population, which is considered stable.

Direct and Indirect Effects to the Snag Assemblage

Implementation of the project would retain habitat characteristics conditions favorable for this assemblage. Canopy closure would be maintained in suitable habitat. In addition, the level of retained snags/acre associated with the Somes Bar Integrated Fire Management Project exceeds the level identified at the high level as identified within the Cavity Nesting and Decadence Wildlife Assemblage Model within the KNF LRMP Final Environmental Impact Statement (FEIS Table I-1). In the long-term, the project will improve habitat conditions for these species.

Existing snags will be maintained at the 80-100% level **unless they pose a hazard to operations**; therefore thinning and fuel reduction activities may affect suitable habitat for these species through the loss of a small amount of snags. There may be some effects to the habitat from understory burning if snags are burned, although excess fuels may be pulled back from the base of large snags. In addition, understory burning will be conducted under wetter conditions to achieve a low intensity burn which will help maintain important habitat components.

A discussion of cumulative effects can be found at the end of this document

Downed Woody Material Assemblage

Arboreal Salamander (*Aneides lugubris*)

The Somes Bar Integrated Fire Management Project is not within the known range of the arboreal salamander.

Clouded Salamander (*Aneides ferreus*)

The Somes Bar Integrated Fire Management Project is not within the known range of the clouded salamander.

Sooty (Blue) Grouse (*Dendragapus fuliginous*)

The sooty grouse is an uncommon to common permanent resident at middle to high elevations. This species occurs in open, medium to mature stands of fir, Douglas fir, and other conifer habitats, interspersed with medium to large openings and available water. It inhabits North Coast Ranges in northwestern California, and the Klamath, Sierra Nevada, and portions of the Warner, White, and Tehachapi Mountains. The sooty grouse utilizes firs and other conifers with dense canopy closure for cover. The primary food items include conifer needles (especially fir and Douglas fir), fruits, flowers, seeds, insects, land snails, and spiders. The species primarily nests on the ground, usually associated with brushy areas adjacent to downed logs or under low tree branches or shrub cover.

The average home range size for the sooty grouse reported by Mussehl (1960) averaged 51 hectares (126 acres), and varied from 12.5 to 115 hectares (31 – 283 acres).

As noted by CDFW, sooty grouse populations within northern California remain consistently stable which is reflected in the stability of the hunter harvest bag limit regulations over the last 5-8 years.

Dusky-footed Woodrat (*Neotoma fuscipes*)

The dusky-footed woodrat is common in California. It is found throughout the Coast Ranges, and in the northern interior (central Siskiyou County, Modoc County, Lassen County, and Shasta County). The species is also widespread along the entire western slope of the Sierra Nevada, mostly below 7,000 feet. The dusky-footed woodrat is abundant in forest habitats of moderate canopy closure and moderate to dense understory. Food items include a variety of woody plants and fungi, flowers, grasses, and acorns. Nest sites are constructed of sticks, grasses and leaves at the base of trees, shrubs, or often at the base of hills.

The average home range size for the dusky-footed woodrat as reported by Cranford (1977) identified 0.23 hectares (0.58 acres) for males and 0.19 hectares (0.43 acres) for females.

The population trend for this species is unknown; however the species is frequently detected across the Forest at track plate stations used to monitor forest carnivores.

Western Fence Lizard (*Sceloporus occidentalis*)

The western fence lizard is probably California's most common reptile. This adaptable lizard is found throughout California except in true desert, where it is restricted to riparian and high mountain locations. The species ranges in elevation from sea level to 10,000 feet. Western fence lizards utilize a variety of habitats from valley-hardwood, grasslands, coniferous, hardwood, and alpine communities. Cover includes tree trunks, woodpiles, wooden fences, rock piles, crevices, burrows, and accumulations of coarse woody debris. Eggs are usually laid within damp, friable, well-aerated soil, in pits dug by females.

Direct and Indirect Effects to the Downed Woody Debris Assemblage

Overall, implementation of the project would retain habitat conditions favorable for the species in this assemblage. Canopy closure in suitable habitat would be maintained. In addition, the level of retained downed logs/acre associated with the Somes Bar Integrated Fire Management Project exceeds the level identified at the high level as identified within the Cavity Nesting and Decadence Wildlife Assemblage Model within the KNF LRMP Final Environmental Impact Statement.

The project will maintain all existing large logs. There may be some effects to the habitat from understory burning if logs are burned. In addition, understory burning will be conducted under wetter conditions to achieve a low intensity burn which will help maintain important habitat components.

Understory burning may also cause short-term habitat degradation through the loss of small woody debris used for nest building (dusky-footed woodrat), but unlikely to have any long-term effects on woodrat populations.

A discussion of cumulative effects can be found at the end of this document

Black Oak/White Oak Assemblage

Western Scrub Jay (*Aphelocoma californica*)

The western scrub jay is a common resident jay associated with scrub and oak woodland habitats. This species occurs west of the Cascades and the Sierra Nevada's from Washington to Baja California. Components of suitable western scrub jay habitat include the presence of oaks, shrubs, grasses, abundant forage and available water. The western scrub jay is uniquely adapted to oak habitats and is probably one of the best avian oak dispersers in California. This species prefers early successional shrub/oak woodland habitats with dense undergrowth that provides shade, cover, nesting habitat and abundant forage and prey. The jay constructs its nest relatively low to the ground in a small tree or shrub. The nest is constructed of twigs and grasses lined with rootlets and other plant fibers. Western scrub jays are gregarious and have been known to steal acorns from acorn woodpecker caches. In addition to acorns, western scrub jays also eat nuts, seeds, fruits, insects, small invertebrates, bird eggs and young birds. This species seeks water regularly therefore optimal habitat would occur close to available water. Similar to the

acorn woodpecker, declining oak woodland habitats is likely to negatively affect the long-term population dynamics of this species.

The average territory size as reported by Verbeek (1973) for the western scrub jay is approximately 7.5 acres in California.

Direct and Indirect Effects

Western scrub jays have been sighted around the Somes Bar Integrated Fire Management Project's four focal areas and the 1.3 mile buffer for the wildlife analysis area. Suitable habitat occurs within the project area and will be improved by proposed activities following Traditional Ecological Knowledge (TEK) practices of returning fire to the landscape to improve acorn producing oak species. Habitat will likely be improved with the release of hardwoods/shrubs through thinning prescriptions and restoration of Douglas-fir. In the long-term the project will improve habitat conditions for this species.

Lazuli Bunting (*Passerina amoena*)

The lazuli bunting is a common summer visitor from April into September throughout most of California except in higher mountains and southern deserts. It breeds in open chaparral habitats and brushy understories of open wooded habitats, especially valley foothill riparian. Often breeds on hillsides near streams. Within arid habitats, the species is restricted to riparian habitats. Nests are usually constructed within dense thickets of shrubs, vines, small trees, or tall grasses.

The reported breeding density as reported by Archie and Hudson (1973) identified 4 males per 100 acres in Grant County, Oregon. Gaines (1974) identified 16 males per 100 acres of riparian habitats within California.

An analysis of the BBS routes on the Forest and within Northern California (Pacific Coast bioregion), showed that the lazuli bunting population is "stable; only 1 route decreasing on the Forest scale" (PSW 2007).

Direct and Indirect Effects

This project will affect a total of 1136 acres of early seral stage habitat due to fuel treatments, prescribed fire treatments, commercial thinning and pre-commercial thinning treatments in former plantation stands. For species that utilize early seral habitat such as the lazuli bunting, this represents 3.2% of the habitat that may benefit the species in the project area.

Implementation of the project would retain habitat characteristics favorable for the species. Implementation of the project will maintain and improve habitat conditions for the lazuli bunting through the release of hardwoods/shrubs through thinning prescriptions. In the long-term, the project will improve habitat conditions for this species.

A discussion of cumulative effects can be found at the end of this document

Western Gray Squirrel (*Sciurus griseus*)

Fairly common locally in mature stands of most conifer, hardwood, and mixed hardwood-conifer habitats in the Klamath, Cascade, Transverse, Peninsular, and Sierra Nevada Ranges (Ingles 1965). The species uses mature trees for cover and requires cavities in trees and snags for nests. Typically, the western gray squirrel utilizes abandoned woodpecker cavities or constructs nests on tree branches composed of shredded bark, grass, mosses, or lichens. The squirrel is highly associated with conifer and oak habitats. Oak mast and hypogenous fungi are vital components of the diet; however, pine nuts, forbs, grasses, and leaves are also consumed.

The average home range size as depicted by Ingles (1947) reported 0.5 –1.8 acres for females and 1.2 to 2.5 acres for males for the western gray squirrel.

There is no trend data for this species; however, this species is considered common throughout the Forest as noted by personal observations.

Direct and Indirect Effects

Implementation of the project would retain habitat characteristics conditions favorable for the species. Implementation of the project will maintain and improve habitat conditions for the western gray squirrel through the maintenance of coniferous canopy closure cover, and the release of hardwoods/shrubs through thinning prescriptions. Additionally, the retention of snags and downed logs would be retained at 80-100% level. In the long-term, the project will improve habitat conditions for this species.

A discussion of cumulative effects can be found at the end of this document

Summary: Impacts to MIS

The project will not adversely impact MIS. The project is designed to improve habitat conditions through the acceleration of late-successional habitat characteristics, while still maintaining current functional habitat. Potential impacts to MIS species would be minimized through the Design Features listed at the beginning of this document and adherence of LRMP Standards and Guidelines including: 1) Retention of snags and downed logs would be retained at 80-100% of the average numbers found within mature and old growth stands within the Forest. In stands other than mature or old growth, five snags per acres and five to twenty pieces of coarse woody debris would be left following KNF LRMP guidelines. 2) Riparian Reserves (RR) are approximately 2,122 acres in the project area and approximately 157 acres have proposed mechanical treatments in the outer-80 feet of those reserves, therefore limited landscape level change in RR. 3) Limited ground disturbance. 4) Canopy closure will be at least 60% in late-successional habitat. 5) Vegetation species diversity and composition will be maintained.

Reduction in canopy density in early seral stage stands may result in small local changes in microclimate in the short term prior to remaining tree crown improvement, but the changes will not increase overall stream and ambient air temperatures. Removal of a portion of the conifer

stand is expected to result in the establishment of hardwoods and a multi-story canopy in the even-aged conifer stands, improving the canopy density and shade for MIS. These indirect effects will lead to improved habitat function in the riparian and upland habitat areas.

Understory burning may also cause short-term habitat degradation through the loss of small woody debris; however, burning will occur under specific weather and moisture condition designed to minimize damage to the residual stand, maintain large woody debris, and maintain at least an average of 50% of the duff layer. Some minor local increases in fuels may occur from slash, but due to the low level of harvest and proposed post-harvest fuel treatments, fuel loading will not be a threat to the RRs or upland areas.

Cumulative Effects

The project occurs in the Carter-Kennedy (7512 acres), Halverson-Klamath River (4386 acres), Ikes-Wilson (8929 acres), Irving Creek (5429 acres), Natuket-Klamath River (7094 acres), Ogaromtoc-Klamath River (4878 acres), Rogers Creek (4261 acres), Sandy Bar Creek (3515 acres) and Stanshaw Creek (2665 acres) watersheds (7th field level). The fraction of the project (49.8 acres) also occurs in the LSR 4799-03 (LSR Management Area S1 4799; Management Area 03).

The project area is 5570 acres in size. There are ten NSO territories that significantly overlap with the project boundary. Four NSO core areas overlap with the project boundary and the NSO Analysis Area is 46,243 acres.

Past management activities in these watersheds have included timber harvest, wildfire, mining and grazing. The negative impacts from timber harvest, fire and mining have included habitat removal and fragmentation, which affected not only nesting habitat, but also important foraging and dispersal habitat.

Timber Harvest

Timber harvest activities and the suppression of wildfire in the Smith basin has led to changes in seral stages and increases in fuels. This shift in seral stage distribution is highest in the tanoak and Douglas-fir series, due to harvest of commercially valuable old-growth Douglas-fir stands that began in the late 1950s. There has been a reduction in old-growth forests and an increase in shrub, pole, and early mature forests.

Most of this harvest activity was concentrated on the lower 1/3 slope in the Douglas-fir and tan oak series. Within the 46,243 acre analysis area, approximately 8,041 acres (17%) are now in the younger seral stages.

Currently there is no known private timber harvesting plans on other ownerships in the action area, based on the CalFire website on 12/3/2017.

Fire

Historical records and fire evidence show that fires regularly occurred in this area with a variety of fire frequencies and intensities. Both wildfires and their exclusion through aggressive suppression affect plant and animal habitat, including stand structure, number of standing snags, amount of large woody debris, soil organic matter content, nutrient availability, and erosion hazard.

The dramatic reduction in wildfire burn acreages over the last 80 years appears to have resulted in unnatural fuel profiles that are more continuous, both horizontally and vertically. Given this increased conifer density, future wildfires could become larger and more destructive than in the past.

In the prolonged absence of fire, and aggravated by other disturbance factors, these fire-adapted forests and grasslands have undergone significant changes in species composition and structure. Intermediate canopy layers and higher ground fuel loadings have developed which allow ground fires to reach the crown more easily, making fires more difficult to control. Young plantations now occupy most of the harvested old-growth sites within the project area. Early and mid-seral stages of Douglas-fir are more susceptible to mortality by wildfire than older late seral stands. Thick, corky bark on the lower bole and roots of older trees protects the cambium from heat damage. In addition, the tall trees have their foliage concentrated on the upper bole, which makes it difficult for fire to reach the crown; however, trees are typically not free of lower branches until they are more than 100 years old (Hermann et al, 1990). Stands selected for treatment in project area are predominantly 80 years old or less.

Literature Cited

Airola, D.A., ed. 1980. California Wildlife Habitat Relationship Program: Northeast Interior Zone. Vol. III. Birds. U.S. Dep. Agric., For. Serv., Lassen Natl. For. , Susanville. 509pp.

Alexander, M. P. and K. J. Burns. 2006. Intraspecific phylogeography and adaptive divergence in the white-headed woodpecker. *The Condor* 108:489-508.

Archie, M. A., and R. A. Hudson. 1973. Scattered mixed coniferous forest in subalpine meadows and spruce bogs. Pages 1002-1003 in W. T. Van Velzen, ed. Thirty-seventh breeding bird census. *Am. Birds* 27:955-1019.

Baldwin, P. H., and W. F. Hunter. 1963. Nesting and nest visitors of the Vaux's swift in Montana. *Auk* 80:81-85.

Baldwin, P. H., and N. K. Zaczkowski. 1963. Breeding biology of the Vaux swift. *Condor* 65:400-406.

Beaver, D. L., and P. H. Baldwin. 1975. Ecological overlap and the problem of competition and sympatry in the western and Hammond's flycatchers. *Condor* 77:1-13.

Behler, J. L., and F. W. King. 1979. The Audubon Society field guide to North American reptiles and amphibians. Alfred Knopf, New York. 743pp.

Beneski, J. T. and D. W. Stinson. 1987. *Sorex palustris*. Mammalian Species 296:1-6.

Bock, C. E., and J. F. Lynch. 1970. Breeding bird populations of burned and unburned conifer forests in the Sierra Nevada. Condor 72:182-189

Bull, E.L., and Beckwith, R. C. 1993. Diet and foraging behavior of Vaux's Swifts in northeastern Oregon. Condor 95:1016-1023.

Bull, E. L., and E. C. Meslow. 1977. Habitat requirements of the pileated woodpecker in northeastern Oregon. J. For. 75:335-337.

Bury, R.B. 1968. The distribution of *Ascapthus truei* in California. Herpetologica 24:39 –46.

Buskirk, S. W. and L. F. Ruggiero. 1994. The American marten. Pages 7–37. in Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, editors. American marten, fisher, lynx, and wolverine in the western United States. U.S. Forest Service General Technical Report RM-254. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado, USA.

California Dept. of Fish and Game 1998. Black Bear Management Plan. CDFG, Wildlife Program Branch, Sacramento, CA. 32 p.

California Dept. of Fish and Game 1998. Report to the Fish and Game Commission: An Assessment of Mule and Black-tailed Derr Habitats and populations in California. Wildlife Program Branch, Sacramento, CA.

Cannings, Richard J. and Tony Angell. 2001. Western Screech-Owl (*Megascops kennicottii*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/597>

Conaway, C. H. 1952. Life history of the water shrew (*Sorex palustris navigator*). The American Midland Naturalist 48(1):219-248.

Craighead, J. J., and F. C. Craighead, Jr. 1956. Hawks, owls and wildlife. Stackpole Books, Harrisburg, PA. 443pp.

Cranford, J. A. 1977. Home range and habitat utilization by *Neotoma fuscipes* as determined by radiotelemetry. J. Mammal. 58:165-172.

Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook. Simon and Schuster, New York. 785pp.

Fitch, H.S. 1947. Predation by owls in the sierran foothills of California. Condor:49:137-151.

- Gaines, D. 1974a. A new look at the nesting riparian avifauna of the Sacramento Valley, California. *West. Birds* 5:61-80.
- Garrett, K., and J. Dunn. 1981. *Birds of southern California*. Los Angeles Audubon Soc. 408pp.
- Garrett, K., MG Raphael, RD Dixon. 1996. White-headed woodpecker: *Picoides albolarvatus* *Birds of North America*. Cornell Lab of Ornithology. Issue 252.
- Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. *Pac. Coast Avifauna* No. 27. 608pp.
- Hollendbeck, J. P., V. A. Saab, and R. W. Frenzel. 2011. Habitat suitability and nest survival of white-headed woodpeckers in unburned forests of Oregon. *Journal of Wildlife Management* 75(5):1061-1071.
- Howell, T. R. 1952. Natural history and differentiation in the yellow-bellied sapsucker. *Condor* 54:237-282.
- Ingles, L. G. 1947. Ecology and life history of the California gray squirrel. *Calif. Fish and Game* 33:138-158.
- Ingles, L. G. 1965. *Mammals of the Pacific states*. Stanford Univ. Press, Stanford, CA. 506pp.
- Jennings, M. R. and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game. Rancho Cordova 255 pp.
- Kelleyhouse, D. G. 1975. Habitat utilization and ecology of the black bear in northern California. M.S. Thesis, Humboldt State Univ., Arcata. 60pp
- Lawrence, L. de K. 1967. A comparative life-history study of four species of woodpeckers. *Ornithol. Monogr.* No. 5. 156pp.
- Longhurst, W. M., A. S. Leopold, and R. F. Dasmann. 1952. A survey of California deer herds, their ranges and management problems. *Calif. Dept. Fish and Game Bull.* No. 6. 136pp
- Manuwal, D. A. 1970. Notes on the territoriality of Hammond's flycatchers in western Montana. *Condor* 72:364-365.
- Marshall, J. T., Jr. 1939. Territorial behavior of the flammulated screech owl. *Condor*. 41:71-78.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1988. *Birds of northern California, an annotated field list*. 2nd ed. Golden Gate Audubon Soc., Berkeley. Reprinted with suppl. 108pp.

Mccallum, D. Archibald. 1994. Flammulated Owl (*Otus flammeolus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/093>

Mussehl, T. W. 1960. Blue grouse production, movements, and populations in the Bridger Mountains, Montana. J. Wildl. Manage. 24:60-68.

Nagorsen, D. W., N. Panter, and A. G. Hope. 2017. Are western water shrews (*Sorex navigator*) and American water shrew (*Sorex palustris*) morphologically distinct? Canadian Journal of Zoology 95:727-736.

Neitro, W.A., R.W. Mannan, D. Taylor, and others. 1985. Snags. In: Brown, E.R. tech. Ed. Management of Wildlife and Fish habitats in Forests of Western Oregon and Washington. Part 1 – Chapter Narratives. R6 F&WL- 192-1985. Portland, OR. USDA Forest Service, Pacific Northwest Region:129-169

Parks, G.P., E.L. Bull, R.O. Tinnin, J.F. Shepard, A.K. Blumton. 1999. Wildlife Use of Dwarf Mistletoe Brooms in Douglas-Fir in Northeast Oregon. Western Journal of Applied Forestry 14 (2). 5p

Raphael, M. G., and M. White. 1984. Use of snags by cavity-nesting birds in the Sierra Nevada. Wild. Monogr. No. 86. 66pp.

Raphael, M. G., and M. White. 1978. Avian utilization of snags in a northern California coniferous forest. U.S. Dep. Agric., For. Serv., Reg. 5, San Francisco. Prog. Rep. 18pp.

Reynold, R.T., and B.D. Linkart. 1987. Fidelity to territory and mate in flammulated owls. P 234-238 in R.W. Nero, R.J. Knapton, and R.H. Hamre (eds). Biology and conservation of northern forest owls: Symposium proceedings. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. GTR-RM-142. 309 p.

Ross, R. C. 1933. Western bluebird nesting in wall tile. Condor 35:73-74.

Sauer, J. R., J. E. Hines, and J. Fallon. 2001. The North American Breeding Bird Survey, Results and Analysis 1966 - 2000. Version 2001.2, USGS Patuxent Wildlife Research Center, Laurel, MD

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2014. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2012. Version 02.19.2014* USGS Patuxent Wildlife Research Center, Laurel, MD.

Slauson, K.M., J.A. Baldwin, W.J. Zielinski, and T.A. Kirk. 2009b. Status and estimated size of the only remnant population of the Humboldt subspecies of the American marten (*Martes*

americana humboldtensis) in northwestern California, Final report. Unpublished report 32 November 25, 2009. USDA FS, PSW, Redwood Sciences Laboratory, Arcata, California.

Slauson, K.M. and W.J. Zielinski. 2009. Characteristics of summer and fall diurnal resting habitat used by American martens in coastal northwestern California. *Northwest Science* 83(1):35–45.

Smith, C. C. 1968. The adaptive nature of social organization in the genus of tree squirrels, *Tamiasciurus*. *Ecol. Monogr.* 38:31-63.

Stebbins, R. C. 1985. A field guide to western reptiles and amphibians. 2nd ed., revised. Houghton Mifflin, Boston. 336pp.

Thomas, J. W., ed. 1979. Wildlife habitats in managed forests: The Blue Mountains of Oregon and Washington. U.S. Dept. Agric., For. Serv., Portland, OR. Agric. Handb. No. 533. 512pp.

Timossi, I. 1990. California statewide wildlife habitat relationships system. California Department of Fish and Game. Computer database for the IBM personal computer. June 1992 version.

USDA Forest Service. 1995. Six Rivers National Forest land and resource management plan (Six Rivers LRMP). Pacific Southwest Region, San Francisco, CA.

USDA Forest Service. 1995. Grouse Creek Watershed Analysis. Six Rivers National Forest. Eureka, CA.

Weins, J. A., and R. A. Nussbaum. 1975. Model estimation of energy flow in northwestern coniferous bird communities. *Ecology* 56:547-561.

Welsh, H.H. Jr., and A.J. Lind. 1996. Habitat correlates of the southern torrent salamander, *Rhyacotriton variegatus* (Caudata: Rhyacotritonidae) in northwest California. *Journal of Herpetology* 30, p 385-398.

Wilson, R.A., P. Manley and B.R. Noon. 1990. Covariance patterns among birds and vegetation in a California oak woodland. In Proc., Symposium on oak woodlands and hardwood rangeland management (Davis, CA Oct. 31-Nov 2 1990). USDA For. Serv. Tech. Rep., PSW-126, p. 126-135.

Winter, J. 1974. The distribution of the flammulated owl in California. *West. Birds.* 5:25-44.

Zeiner, D.C., W. Laundenslayer, Jr. K. Mayer, and M. White, eds. 1990. California's Wildlife, Vol. 2 Birds. California Department of Fish and Game. Sacramento. 732 pp.